

## CLAIMS

### What is claimed is:

1. A method of producing a desired protein by gene recombination, the method comprising the steps of:
  - 5 (a) constructing a gene expression vector comprising a gene that encodes the desired protein and a promoter which has an inductive activity for transcription during the resting stage of cell growth, wherein the transcription is induced by an organic acid compound;
  - (b) introducing said gene expression vector into a host cell;
  - 10 (c) inducing the expression of said desired protein by culturing said host cell in culture medium; and
  - (d) recovering the desired protein.
2. The method according to claim 1, wherein said organic acid compound is one selected  
15 from the group consisting of acetic acid, succinic acid, maleic acid, fumaric acid and citric acid.
3. The method according to claim 1, wherein said promoter includes 1kb upstream DNA fragment of *acs* gene of *E. coli*.
- 20 4. The method according to claim 3, wherein said *acs* promoter is derived from bacteria, fungi, yeasts or actinomyces.
5. The method according to claim 1, wherein said gene contains a DNA fragment that encodes any one selected from the group consisting of hormones, hormone analogs, enzymes,  
25 enzyme inhibitors, receptors or their fragments, antibodies or their fragments, single-chain antibodies, structural proteins, toxin proteins, and plant defense-inducing molecules.
6. The method according to claim 5, wherein said gene contains a DNA fragment selected from the group consisting of *acs* gene that encodes acetyl Co A synthetase, *lac Z* gene that  
30 encodes  $\beta$ -galactosidase, *chiA* gene that encodes chitinase or *tliA* gene that encodes lipase.
7. The method according to claim 1, wherein said host cell is Gram-negative bacteria.
8. The method according to claims 1, wherein said culture medium is one selected from  
35 the group consisting of a complex medium, a minimal culture medium containing acetic acid

or succinic acid as a sole carbon source, and a minimal medium containing glucose or glycerol as a sole carbon source.

9. The method according to claim 8, wherein said culture medium is the minimal medium  
5 containing glucose or glycerol as a sole carbon source and wherein said culture medium contains either acetic acid or succinic acid as an inducer.

10. A vector comprising a gene that encodes a desired protein and a promoter which has an  
inductive activity for transcription during the resting stage of cell growth, wherein the  
10 transcription is induced by an organic acid compound.

11. The vector according to claim 10, wherein said organic acid compound is one selected from the group consisting of acetic acid, succinic acid, maleic acid, fumaric acid and citric acid.

12. The vector according to claims 10 or 11, wherein said promoter includes 1kb upstream  
15 DNA fragment of *acs* gene of *E. coli*.

13. The vector according to claim 12, wherein said *acs* promoter is derived from bacteria, fungi, yeasts or actinomyces.

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14. The vector according to claim 10, wherein said gene contains a DNA fragment that encodes one selected from the group consisting of hormones, hormone analogs, enzymes, enzyme inhibitors, receptors or their fragments, antibodies or their fragments, single-chain antibodies, structural proteins, toxin proteins, and plant defense-inducing molecules.

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15. A transformed cell comprising the vector according to any one of claims 10 to 14.

16. The cell according to claim 15, wherein the cell is Gram-negative bacteria.

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